

Patent Claims

1. An electrode for a Li-based electrochemical energy storage device, the electrode comprising at least one transition metal halide with a binder, e.g. at least one of PVDF, PTFE, PAN and ETDM and optionally with at least one conductive additive such as carbon black, graphite, metal powder and metal fibres.
2. The electrode of claim 1, wherein the halide is a fluoride.
3. An electrode in accordance with claim 1 or claim 2, the electrode comprising a transition metal chosen from the group comprising Ti, V, Cr, Ni, Mn, Fe, Co, Cu.
4. An electrode for a Li-based electrochemical energy storage device, the electrode comprising at least one of molybdenum oxide and ruthenium oxide with a binder, e.g. at least one of PVDF, PTFE, PAN and ETDM and optionally with at least one conductive additive such as carbon black, graphite, metal powder and metal fibres.

5. An electrode for a Li-based electrochemical energy storage device, the electrode comprising an LiX-M amorphous composite or nano-composite where:
Li is lithium,
X is fluorine and
M is any transition metal in initially metallic form, the transition metal being in the form of metal clusters and the metal clusters and the LiX being dispersed at an atomic scale or at a nanometer scale to provide a highly reversible lithium storage behaviour.
6. An electrode for a Li-based electrochemical energy storage device, the electrode comprising an LiX-M amorphous composite or nano-composite where:
Li is lithium,
X is oxygen and
M is at least one of ruthenium and molybdenum in initially metallic form, in the form of metal clusters and the metal clusters and the LiX being dispersed at an atomic scale or at a nanometer scale to provide a highly reversible lithium storage behaviour.
7. A Li-based electrochemical storage device comprising positive and negative electrodes and an electrolyte disposed between them, the electrolyte including a lithium salt, an organic, non-aqueous, anhydrous solvent or a polymer and the positive and negative electrodes comprising an LiX-M amorphous composite or nano-composite where:
Li is lithium,
X is fluorine and
M is any transition metal in initially metallic form.

8. A Li-based electrochemical storage device comprising positive and negative electrodes and an electrolyte disposed between them, the electrolyte including a lithium salt, an organic, non-aqueous, anhydrous solvent or a polymer and the positive and negative electrodes comprising an LiX-M amorphous composite or nano-composite where:
Li is lithium,
X is oxygen and
M is ruthenium or molybdenum in initially metallic form.
9. A Li-based electrochemical storage device in accordance with any one of the claims 1 to 8 wherein it is realised as a rechargeable battery.
10. A Li-based electrochemical storage device in accordance with any one of the claims 1 to 8 wherein it is realised as a supercapacitor.